

Math 1050 – Exam 4 Review

1. Graph the equation: $(x-2)^2 + y^2 = 9$.
2. Write the standard form of the equation of the circle with radius $r = 4$ and center $(2, -5)$.
3. Find the equation of a circle in standard form with center at the point $(1, 6)$ that is tangent to the line $x = 3$.
4. Find the equation of a circle in standard form where $C(2, -5)$ and $D(6, 1)$ are endpoints of a diameter.
5. Find the center (h, k) and the radius r of the circle with the given equation: $x^2 + y^2 - 10x + 6y - 2 = 0$.
6. Find the equation of the parabola with focus at $(1, -1)$ and directrix the line $y = -5$.
7. Find the vertex, focus, and directrix of the parabola. Graph the equation. $(y-4)^2 = 8(x+2)$.
8. Find the vertex, focus, and directrix of the parabola. Graph the equation. $(x+3)^2 = -(y-1)$.
9. Graph the ellipse and locate the foci: $9x^2 + 4y^2 = 36$.
10. Find the center, foci, and vertices of the ellipse with the equation $\frac{(x+1)^2}{4} + \frac{(y-2)^2}{9} = 1$.
11. A hall 100 feet in length was designed as a whispering gallery. If the ceiling is 20 feet high at the center, how far from the center are the foci located?
12. Graph the hyperbola: $16y^2 - 9x^2 = 144$.
13. Find the center, transverse axis, vertices, foci and asymptotes of the hyperbola with equation $\frac{(y+2)^2}{4} - \frac{(x-3)^2}{9} = 1$.
14. Find the equation for the hyperbola with vertices at $(0, \pm 5)$ and foci at $(0, \pm 7)$.
15. Find the equation for the hyperbola with center $(2, 3)$, focus $(0, 3)$, and vertex $(1, 3)$.
16. Write the augmented matrix for the system
$$\begin{cases} 4x - 3y + z = -2 \\ 5y - z = 6 \\ 2x + 8z = -9 \end{cases}$$
.

For questions 17-19, state whether the system of equations corresponding to the given matrix is consistent or inconsistent, state how many solutions it has, and give the solution set.

17.
$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 1 \end{array} \right]$$

18.
$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 0 & 1 \end{array} \right]$$

19.
$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 3 & 4 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

20. Perform the requested row operation on the matrix
$$\left[\begin{array}{ccc|c} 2 & 4 & 5 & -2 \\ 1 & 2 & 3 & 4 \\ 3 & 3 & 7 & 1 \end{array} \right]$$
. $R_2 = -3r_2 + r_3$.

21. Find the value of the determinant by hand: $\begin{vmatrix} 3 & 5 \\ -2 & 7 \end{vmatrix}$.

22. Solve for x : $\begin{vmatrix} 2 & -5 \\ 4 & x \end{vmatrix} = 6$.

23. Find the value of the determinant by hand: $\begin{vmatrix} -1 & 2 & 1 \\ 2 & -2 & 3 \\ 3 & -1 & 0 \end{vmatrix}$.

24. Solve the system of equations using row operations. If the system has no solution, say that it is inconsistent. $\begin{cases} 2x - 3y = 5 \\ x + 4y = -7 \end{cases}$.

25. Given that D , the determinant of the coefficient matrix is equal to 10, use Cramer's rule to find the value of z . Do not solve for x or y . $\begin{cases} 2x - y + z = 3 \\ x - y - z = 4 \\ x + 2y - 2z = 1 \end{cases}$.

Use the following matrices to answer questions 26-28: $A = \begin{bmatrix} 2 & 1 \\ 4 & -3 \end{bmatrix}$. $B = \begin{bmatrix} -3 & 4 \\ -2 & 7 \end{bmatrix}$.

26. Find $A + B$.

27. Find $3A - 2B$.

28. Find $I_2 - 4A$.

29. Compute the product: $\begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 4 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 \\ -1 & 0 \\ 2 & 4 \end{bmatrix}$

30. Compute the product: $\begin{bmatrix} 1 & 0 \\ -4 & 5 \\ 3 & -9 \end{bmatrix} \cdot \begin{bmatrix} 2 & 3 & 5 \\ 11 & 2 & -7 \\ 8 & 0 & 1 \end{bmatrix}$

31. Find the inverse of the matrix by hand: $A = \begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}$.

32. Solve the system using the inverse matrix method: $\begin{cases} x + 2y + 3z = 2 \\ x + y + z = -3 \\ -x + y + 2z = 4 \end{cases}$.

The inverse of $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 1 \\ -1 & 1 & 2 \end{bmatrix}$ is $\begin{bmatrix} 1 & -1 & -1 \\ -3 & 5 & 2 \\ 2 & -3 & -1 \end{bmatrix}$.

For questions 33-36, find the partial fraction decomposition.

33. $\frac{3x-5}{(x-2)(x+3)}$

34. $\frac{x}{x^2+7x+12}$

35. $\frac{3x^2-2x+4}{(x+1)(x-1)^2}$

36. $\frac{2x+1}{(x+3)(x^2-3x+9)}$